doi : 10.17596/0002659

R/V Kaimei Cruise Report
KM18-07C_Leg1

SIP Project for Development of New-Generation Research Protocol for Submarine Resources: survey for baseline condition of hydrothermal vent area and in situ examination of observation tools.

Nansei Archipelago

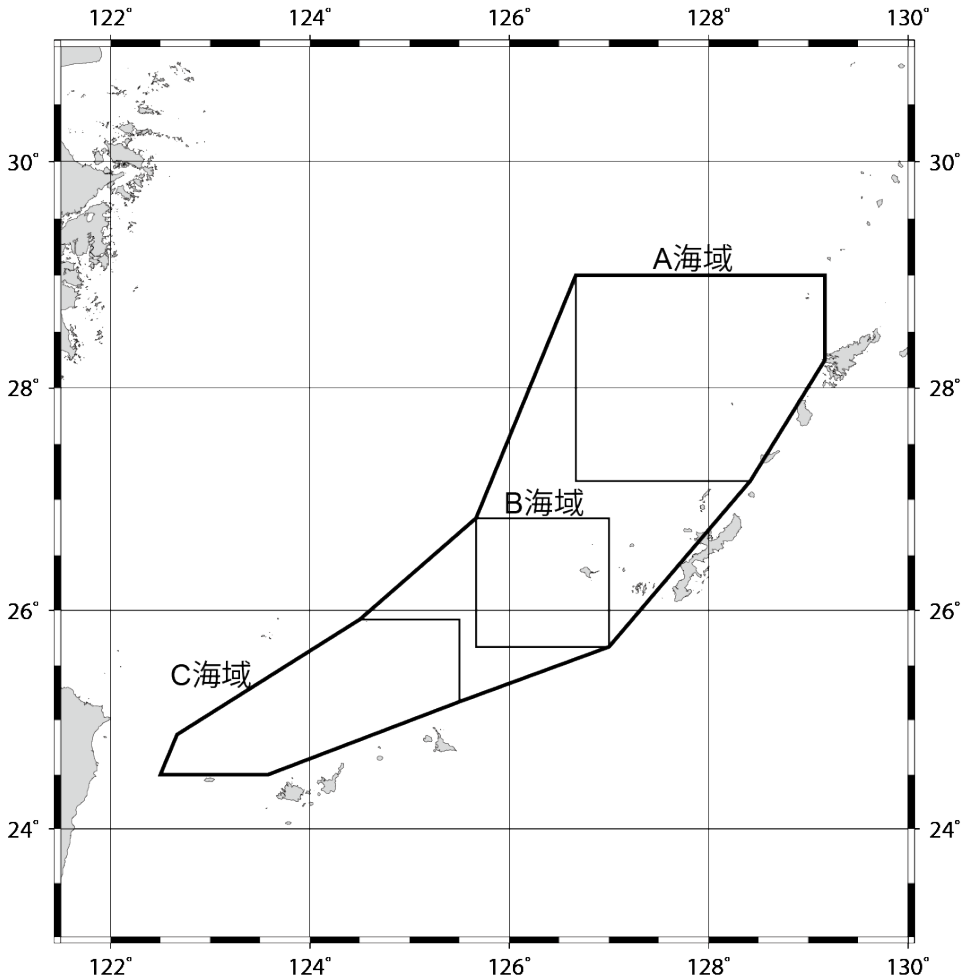
July 27 to August 7, 2018

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Contents

1. Cruise Information

- Cruise ID KM18-07C_Leg1
- Name of vessel R/V Kaimei
- Title of the cruise
  SIP Project for Development of New-Generation Research Protocol for Submarine Resources: survey for baseline condition of hydrothermal vent area and in situ examination of observation tools.
- Title of proposal Survey and monitoring the environments of hydrothermal vent area
- Cruise period July 27 to August 7, 2018
- Ports of departure / call / arrival JAMSTEC Yokosuka / Okinawa
- Research area Nansei Archipelago
- Research Map



A: Tokara Islands area, depth 500m～1,550m
B: Central Okinawa Trough, depth 500m～1,550m
C: Southern Okinawa Trough, depth 500m～2,300m

2. Research party

● Chief Scientist:

Hiroyuki YAMAMOTO	JAMSTEC

● RePresentative of Scientice Party:

Eiichi KIKAWA	JAMSTEC

● Science party

KAWAGUCHI Shinsuke	JAMSTEC
LINDSAY Dhugal	JAMSTEC
WATANABE Hiromi	JAMSTEC
KONDO Shunsuke	JAMSTEC
MAEDA Yosaku	JAMSTEC
CHEN Chong	JAMSTEC
YAHAGI Takuya	JAMSTEC
YOSHIMURA Shota	JAMSTEC
SANO Michinori	Astro Design Ltd. Co
HORAI Toshiiku	Kyushu University
MUTO Hisashi	Kyoto University
NISHI Shotaro	JAMSA
MISHINA Hirofumi	JAMSA

R/V KAIMEI CREW

Captain	YOSHIDA Rikita
Chief Officer	KIMURA Naoto
2nd Officer	SUZUKI Akira
Jr.2nd Officer	MIYAKE Kazuki
3rd Officer	ITO Yuki
Jr.3rd Officer	YUKAWA Tomohiro
Chief Engineer	FUNAE Koji
1st Engineer	IKUTA Shinichi
2nd Engineer	YAMAGUCHI Katsuto
3rd Engineer	RYOSYU Hayato
Chief Electronic Operator	NASU Tokinori
2nd Electronic Operator	NISHIO Emi
Jr.2nd Electronic Operator	SHIROZUME Takatomo
3rd Electronic Operator	UGAJIN Kazumi
Boat Swain	OHATA Masanori
Able Seaman	IWASAKI Naoki
Able Seaman	HIRAI Saikan
Able Seaman	KAWABE Yasunobu
Sailor	OHJIRI Yuta
Sailor	YOSHIMI Yudai
Sailor	SAITO Akira
No.1 Oiler	FUNAWATARI Keita
Oiler	SUGI shinya
Oiler	HIGASHIGAWA Yuji
Oiler	MISAGO Sota
Assistant Oiler	YAMAZAKI Keita
Assistant Oiler	KAWANO Motohiro
Chief Steward	CHIKUBA Yukihide
Steward	HIRAI Tatsuya
Steward	YAMAMOTO Yoshitaka
Steward	ABE Takahiro

Steward	KUBOTA Ryu

KM-ROV Operation Team

Operation Manager	MIURA Atsumori
1st ROV Operator	ONO Yoshinari
2nd ROV Operator	ISHITSUKA Tetsuya
2nd ROV Operator	CHIBA KATSUSHI
2nd ROV Operator	TAKENOUCHI Atsushi
2nd ROV Operator	UEKI Hirohumi
2nd ROV Operator	CHIDA Yosuke
2nd ROV Operator	KIKUYA Shigeru
2nd ROV Operator	SAKAKIBARA Yudai
2nd ROV Operator	KUMAGAI Shinosuke
3rd ROV Operator	SUGIURA Shuya
3rd ROV Operator	KOGUMA Atushi

Deep-Tow Operation Team

Operator	HASHIMOTO Yasushi
Operator	MIYAJIMA Yuki
Operator	KANII Takehiro
Operator	FUKABORI Kento

Marine Technician

Research Engineer	KATAGIRI Michiyasu
Research Engineer	KUNO Mitsuteru

3. Research/Development Activities

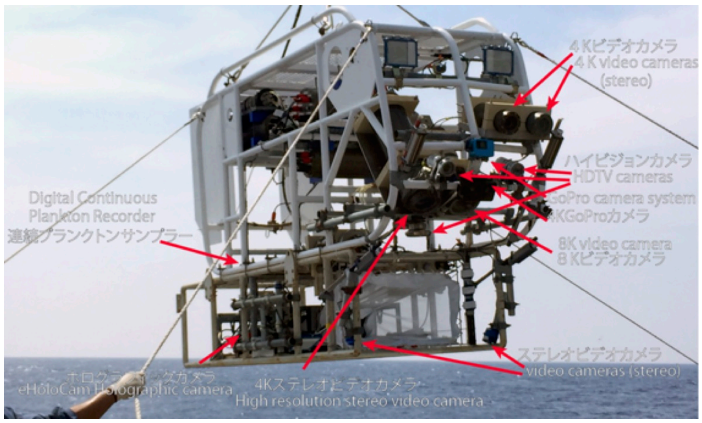
Research overview

This cruise has been planned in a series of research to collect the baseline data of environments and biodiversity on Okinawa Through and adjacent sea area, to confirm the technical protocols of observation tools and operation processes. The baseline data, e.g. oceanographic structure, seafloor condition, biodiversity and distribution pattern, were gathered from hydrothermal vent fields where are anticipated the resource potentials of polymetallic sulfides.

Survey by high-resolution imaging system using Deep-Tow

Dhugal Lindsay, Shota Yoshimura, Michinori Sano, Yosaku Maeda

High-performance camera system consisted of 8K video camera, 4K stereo camera, holographic camera, was installed on Deep-Tow frame. This system could collect many information of habitat condition, seafloor classification, distribution pattern of fauna.

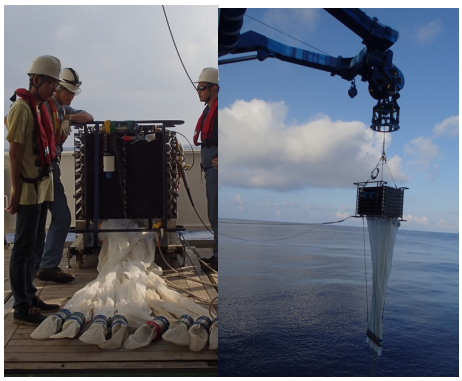


Deep-Tow system for ecological observation

Survey by plankton net system

Hiromi Watanabe, Chong Chen, Takuya Yahagi

The vertical multiple-plankton net system (VMPS) was used in this cruise. The plankton samples were collected from surface to bottom layers.



VMPS

Survey by KM-ROV

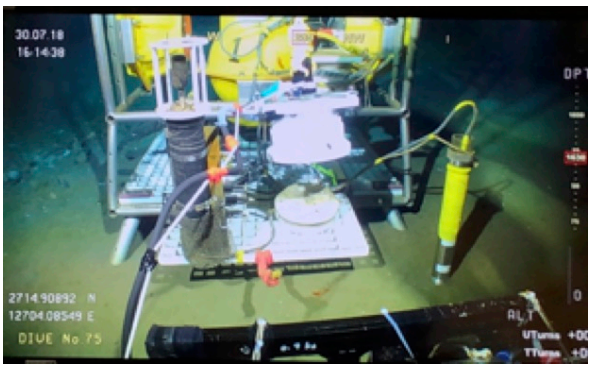
Shinsuke Kawaguchi, Hisashi Muto, Toshiiku Horai, Hiromi Watanabe, Chong Chen

The sample collection of epifauna, geochemical and microbiological research were planned, but has been cancelled by machine trouble of acoustic navigation system of *R/V Kaimei*.

Data recovery by electromagnetic communication unit

Shunsuke Kondo

The communication unit was installed on KM-ROV. The data of long-term seafloor observatory, LEMON lander, which deployed in Izena Hole in cruise of January 15, could be recovered by the communication unit.



Attaching the unit of ROV to the communication port of LEMEON lander

Deployment of in situ observation platform EDOKKO Mrk-1 type 365

Shunsuke Kondo

EDOKKO Mark-1 type 365, is a new design of free-fall/ standalone platform for seafloor observation system for one-year operation. It was deployed on Izena Hole site. Edokko Mark I Type 365 was deployed at Izena Hole of Okinawa Trough on 30 July 2018 for long-term seafloor observation, approximately 3 months. Edokko Mark I Type 365 is a stand-alone type and has cameras and lights to take moving images of seafloor for a given length of time at every given time interval. The video recording time and time interval are programmed through a simple user interface before the launch. A free-fall method is used to deploy it on the seafloor and a weight is released by using acoustic communication for recovery. The position placed on the seafloor is 27º15.000'N, 127º4.070'E, and 1633m depth, which were measured by the transponder mounted on Edokko Mark I Type 365 and the super short baseline (SSBL) system of R/V Kaimei. Edokko Mark I Type 365 deployed in this expedition will take a moving image for 1 minute at every 1 hours through approximately 3 months and is planned to be recovered on October this year.

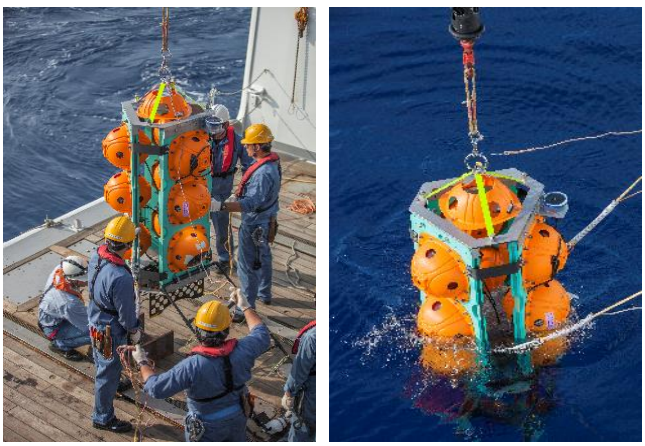


Figure: Just before the launch of Edokko Mark I Type 365 for 3-month observation.

Making of practical EIA protocol

Hirofumi Mishina, Shota Nishi, Shunsuke Kondo

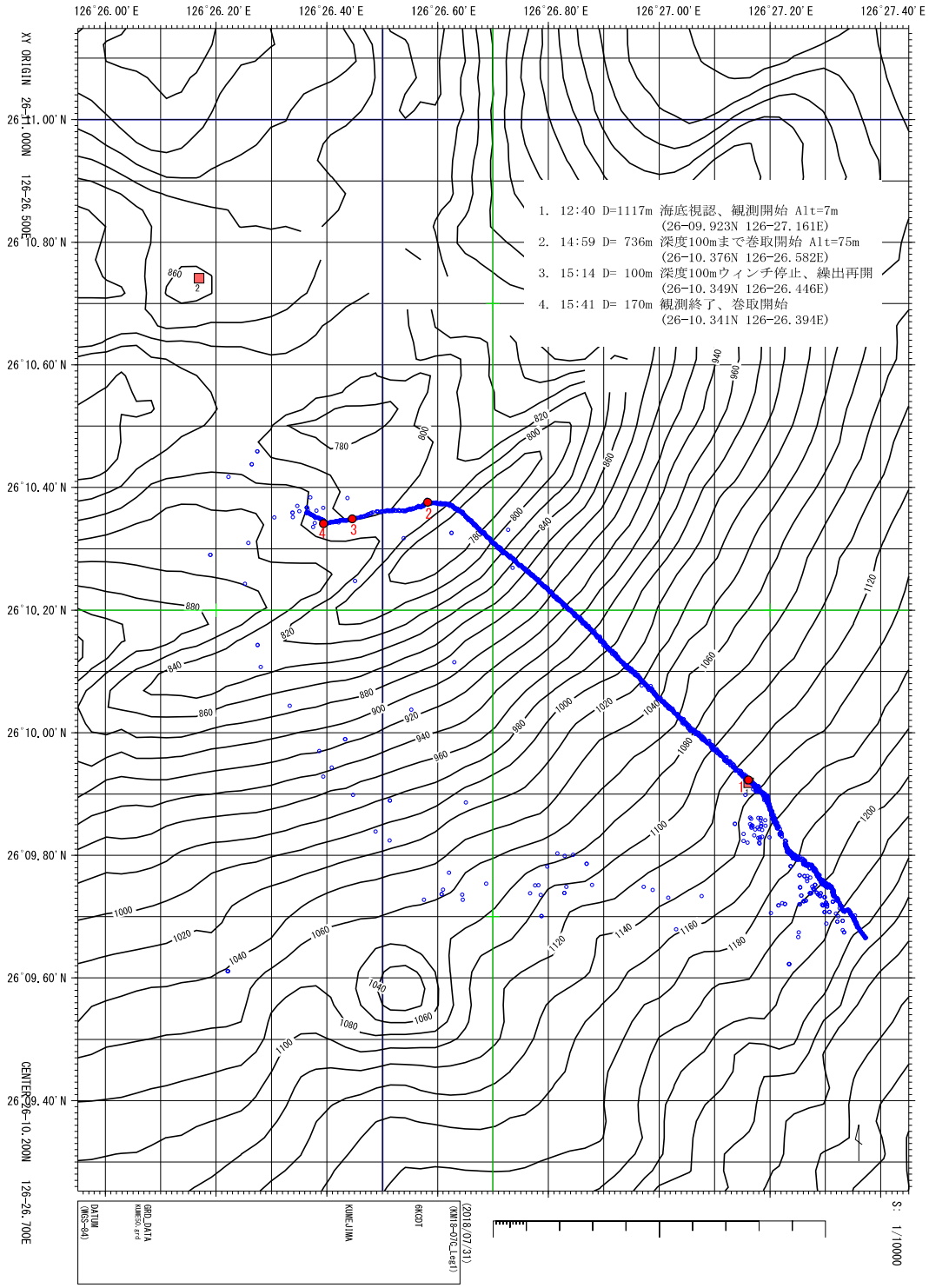
The practical protocols related to environmental impact assessment for seabed mining are prepared for technology transfer to marine industries. In this cruse, confirmation of the protocol contents has been

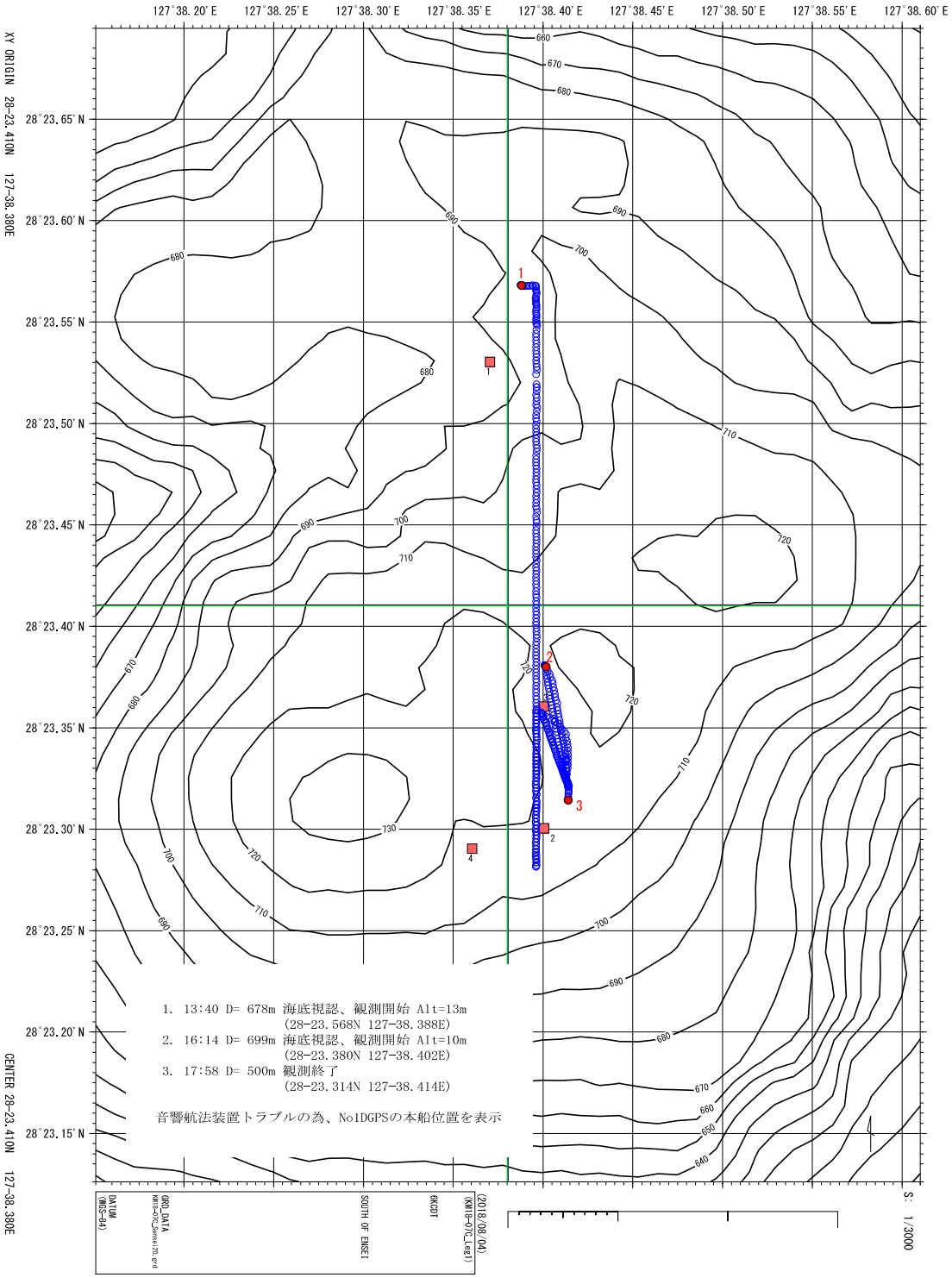
done to edit the final version.

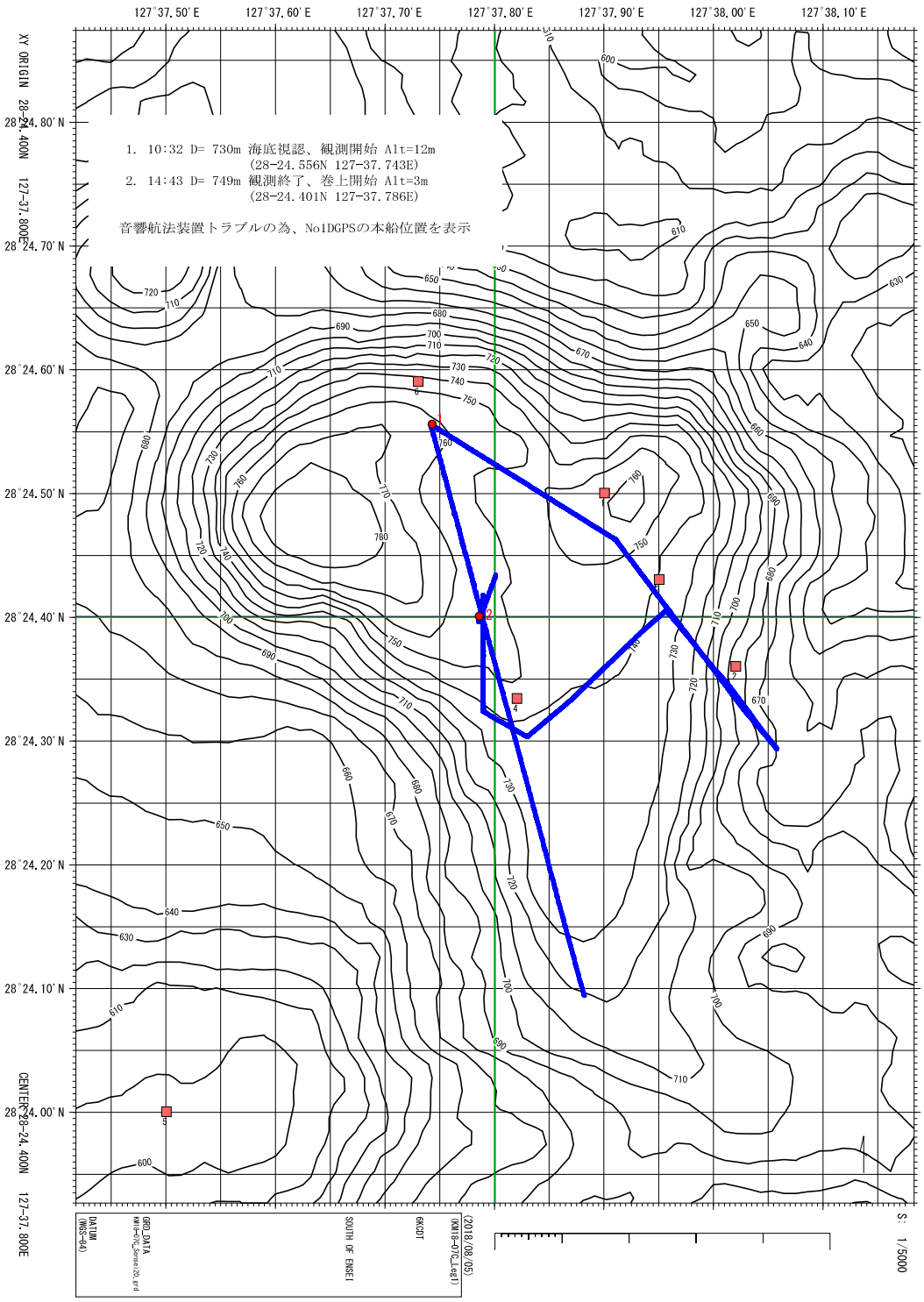
●Dive information

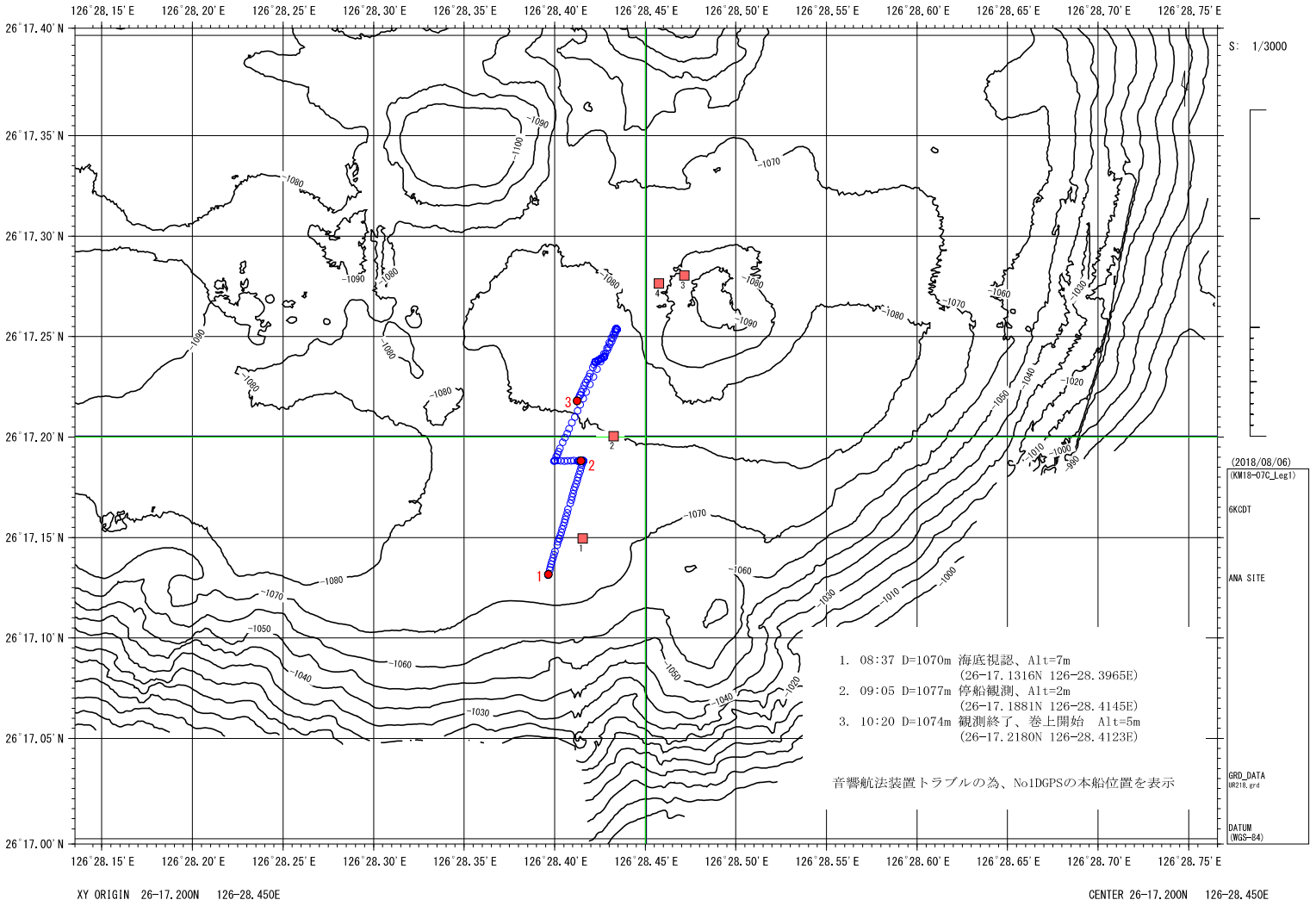
6KCDT 20180730

6KCDT 20180731

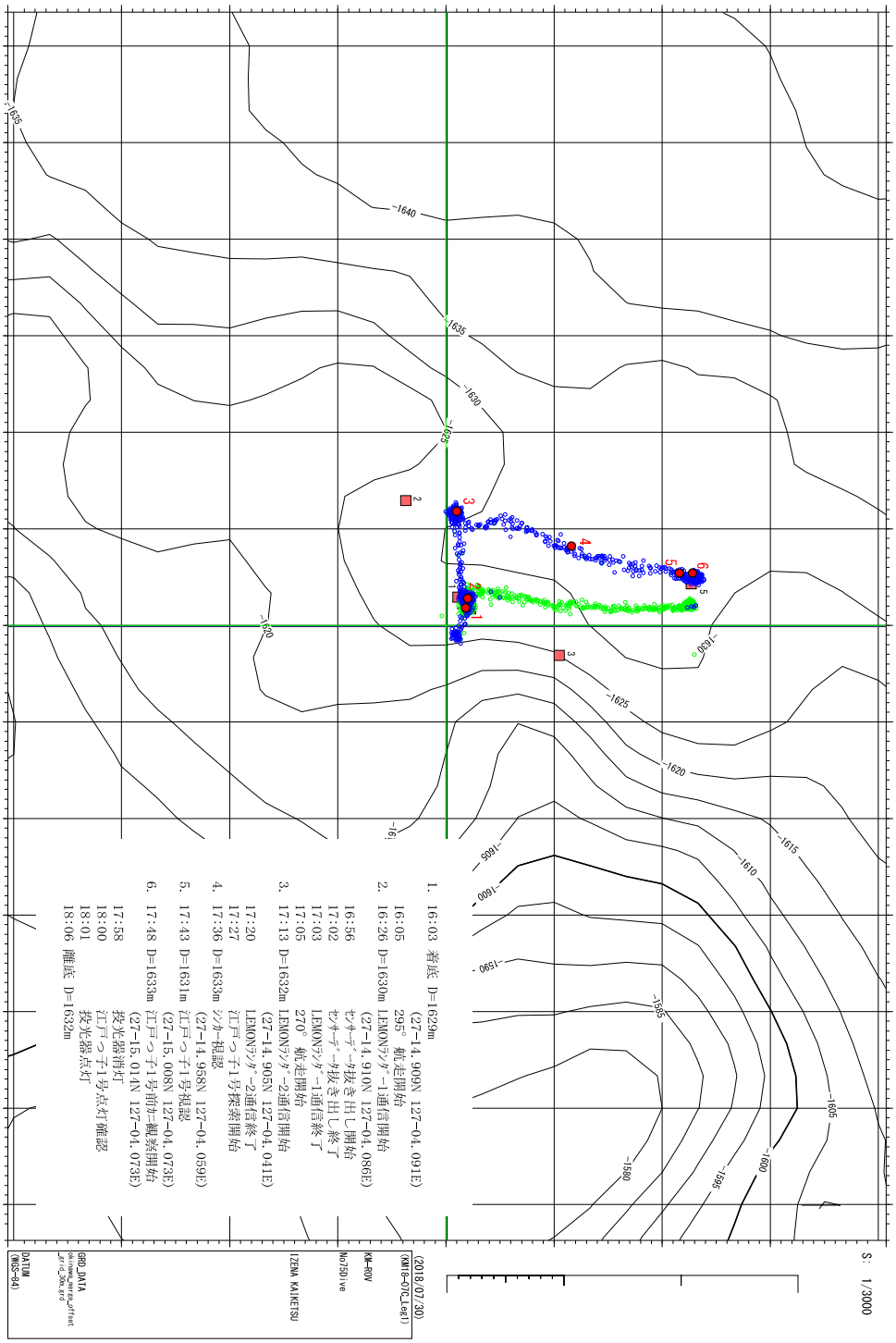



127°38.20'E
127°38.25'E
127°38.30'E
127°38.35'E
127°38.40'E
127°38.45'E
127°38.50'E
127°38.55'E
127°38.60'E
28°23.65'N
28°23.60'N
28°23.55'N
28°23.50'N
28°23.45'N
28°23.40'N
28°23.35'N
28°23.30'N
28°23.25'N
28°23.20'N
28°23.15'N
XY ORIGIN 28-23.410N 127-38.380E
CENTER 28-23.410N 127-38.380E
1. 13:40 D= 678m 海底視認、観測開始 Alt=13m
(28-23.568N 127-38.388E)
2. 16:14 D= 699m 海底視認、観測開始 Alt=10m
(28-23.380N 127-38.402E)
3. 17:58 D= 500m 観測終了
(28-23.314N 127-38.414E)
音響航法装置トラブルの為、No1DGPSの本船位置を表示
DATUM (WGS-84)
SOUTH OF ENSEI
6KCDT
(2018/08/04)
S: 1/3000

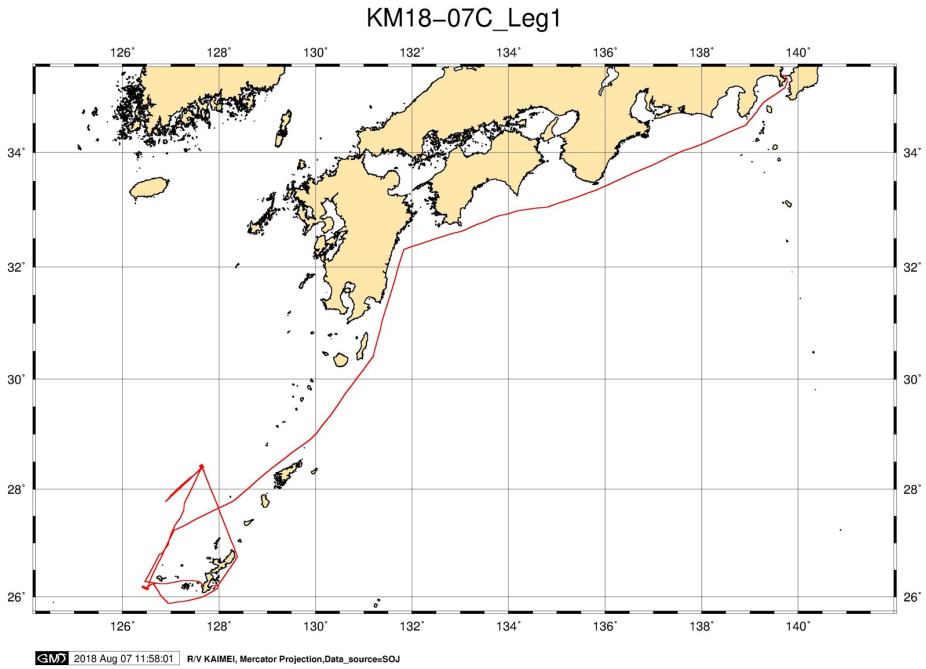

127°37.50'E
127°37.60'E
127°37.70'E
127°37.80'E
127°37.90'E
127°38.00'E
127°38.10'E
XY ORIGIN 28-24.400N 127-37.800E
CENTER 28-24.400N 127-37.800E
28°24.80'N
28°24.70'N
28°24.60'N
28°24.50'N
28°24.40'N
28°24.30'N
28°24.20'N
28°24.10'N
28°24.00'N
1. 10:32 D= 730m 海底視認、観測開始 Alt=12m
(28-24.556N 127-37.743E)
2. 14:43 D= 749m 観測終了、巻上開始 Alt=3m
(28-24.401N 127-37.786E)
音響航法装置トラブルの為、No1DGPSの本船位置を表示
DATUM (WGS-84)
GRD_DATA (KM18-07C_Sense120.grd)
SOUTH OF ENSEI
6KCDT
(2018/08/05) (KM18-07C_Leg1)
S: 1/5000



6KCDT 20180806


XY ORIGIN 27-14.900N 127-04.100E
CENTER 27-14.900N 127-04.100E
S: 1/3000
1. 16:03 着底 D=1629m
(27-14.909N 127-04.091E)
16:05 295° 航走開始
2. 16:26 D=1630m LEMONランダー1通信開始
(27-14.910N 127-04.086E)
16:56 センサーデータ抜き出し開始
17:02 センサーデータ抜き出し終了
17:03 LEMONランダー1通信終了
17:05 270° 航走開始
3. 17:13 D=1632m LEMONランダー2通信開始
(27-14.905N 127-04.041E)
17:20 LEMONランダー2通信終了
17:27 江戸っ子1号探索開始
4. 17:36 D=1633m シンカー視認
(27-14.958N 127-04.059E)
5. 17:43 D=1631m 江戸っ子1号視認
(27-15.008N 127-04.073E)
6. 17:48 D=1633m 江戸っ子1号前ガー観察開始
(27-15.014N 127-04.073E)
17:58 投光器消灯
18:00 江戸っ子1号点灯確認
18:01 投光器点灯
18:06 離底 D=1632m
(2018/07/30)
KM18-07C_Log01
KM-ROV
No750:ive
IZENA KAIKETSU
GRD_DATA
DATUM
(WGS-84)

4. Cruise Log



5. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.
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E-mail: submit-rv-cruise@jamstec.go.jp